CLAIMS: The following is a listing of all claims in the application with their status and the text of all active claims.

1. (CURRENTLY AMENDED) A method of recovering data in a received signal sent in a communications media, comprising:

   (a) estimating at least one composite channel impulse response from said received signal,

   (b) estimating a set of noise covariances based on said composite channel impulse response,

   (c) assigning a set of channel-tap locations by a sequential search based on said composite channel impulse response, <u>with each said channel tap depending on said composite channel impulse response</u>,

   (d) computing a set of weight coefficients for said set of channel-tap locations based on said composite channel impulse response, and

   (e) demodulating data in said received signal with said set of channel-tap locations and said set of weight coefficients.

2. (ORIGINAL) The method of claim 1, wherein estimating said set of noise covariances based on said composite channel impulse response comprises:

   (a) decomposing said noise variance into a one-dimensional part, a cyclostationary part, and a two-dimensional part,

   (b) pre-computing and tabulating said one-dimensional part of said noise variance using a one-dimensional table,

   (c) pre-computing and tabulating said cyclostationary part of said noise variance using a plurality of one-dimensional tables,

   (d) accessing said one-dimensional tables to retrieve said one-dimensional part and said cyclostationary part of said noise covariance, and

   (e) computing said two-dimensional part of said noise covariance.

3. (CURRENTLY AMENDED) The method of claim 1, wherein said sequential search comprises:

   (a) determining a search region based on said composite channel impulse response,

   (b) pre-selecting a first set of channel-tap locations in said search region based on said composite channel impulse response, if said first set is predetermined to be non-empty, and

   (c) sequentially selecting a second set of channel-tap locations in said search region, based on said first set of channel-tap locations, to optimize a design criterion.

4. (PREVIOUSLY PRESENTED) The method of claim 3, wherein said search region is a contiguous region comprising a span of said composite channel impulse response, a pre-composite-channel-impulse-response section, and a post-composite-channel-impulse-response section.

5. (ORIGINAL) The method of claim 3, wherein said search region is a union of a set of path regions and a set of mirror image regions.

6. (CANCELED)

7. (ORIGINAL) The method of claim 3, wherein pre-selecting said first set of channel-tap locations comprises choosing a number of strongest channel taps according to said composite channel impulse response, the distances among which are equal to or larger than a predetermined minimum distance.

8. (PREVIOUSLY PRESENTED) The method of claim 3, wherein said design criterion is mean square error, whereby said mean square error is computed based on said composite channel impulse response.

9. (PREVIOUSLY PRESENTED) The method of claim 3, wherein said design criterion is signal-to-noise ratio, whereby said signal-to-noise ratio is computed based on said composite channel impulse response.

10. (ORIGINAL) The method of claim 3, wherein sequentially selecting said second set of channel-tap locations to optimize said design criterion comprises choosing a

new channel-tap location that optimizes said design criterion based on a recursive evaluation that explicitly depends on:

(a) a set of previously evaluated functions of all previously chosen channel-tap locations, and

(b) a set of functions of said new channel-tap location, whereby said recursive evaluation can reduce the amount of computations.

11. (ORIGINAL) The method of claim 10, wherein said recursive evaluation comprises:

(a) a function of said design criterion,

(b) a recursive equation of said function of said design criterion,

(c) a difference between two consecutive recursion values of said function of said design criterion, which is to be optimized by said new channel-tap location, and

(d) a recursive equation of a noise variance matrix.

12. (ORIGINAL) The method of claim 3, wherein sequentially selecting said second set of channel-tap locations to optimize said design criterion comprises choosing a new channel-tap location that optimizes said design criterion based on an approximate recursive evaluation that explicitly depends on:

(a) a set of previously evaluated functions of all previously chosen channel-tap locations, and

(b) a set of functions of said new channel-tap location,

whereby said approximate recursive evaluation can further reduce the amount of computations.

13. (PREVIOUSLY PRESENTED) The method of claim 12, wherein said approximate recursive evaluation comprises:

(a) a function of said design criterion,

(b) a recursive equation of said function of said design criterion,

(c) a simplified and approximate difference between two consecutive recursion values of said function of said design criterion, which is to be optimized by said new channel-tap location, and

(d) a recursive equation of the inverse of a noise variance matrix.

14. (ORIGINAL) The method of claim 3, wherein sequentially selecting said second set of channel-tap locations to optimize said design criterion can be terminated early before a predetermined number of channel-tap locations has been selected, if the difference between the value of said design criterion before a new tap is selected and the value of said design criterion after said new tap is selected is below a predetermined threshold.

15. (CANCELLED)

16. (PREVIOUSLY PRESENTED) The method of claim 1, wherein recovering data in said received signal sent in said communications media is performed at 2x oversampling.

17. (PREVIOUSLY PRESENTED) A method of recovering data in a received signal sent in a communications media, comprising:

(a) estimating at least one composite channel impulse response from said received signal,

(b) estimating a set of noise covariances based on said composite channel impulse responses,

(c) assigning a set of channel-tap locations by a heuristic search based on said composite channel impulse response,

(d) computing a set of weight coefficients for said set of channel-tap locations based on said composite channel impulse response, and

(e) demodulating data in said received signal with said set of channel-tap locations and said set of weight coefficients.

18. (PREVIOUSLY PRESENTED) The method of claim 17, wherein said heuristic search comprises:

    (a) pre-selecting a first set of channel-tap locations based on said composite channel impulse response, and

    (b) selecting a second set of channel-tap locations in said search region by a heuristic search scheme based on said first set of channel-tap locations.

19. (ORIGINAL) The method of claim 18, wherein pre-selecting said first set of channel-tap locations comprises choosing a number of strongest channel taps according to said composite channel impulse response, the distances among which are equal to or larger than a predetermined minimum distance.

20. (ORIGINAL) The method of claim 18, wherein said heuristic search scheme comprises choosing a number of channel taps, where the distance of a thus-chosen channel tap to another thus-chosen channel tap or to a pre-selected channel tap equals to the distance between a pair of pre-selected channel taps.

21. (ORIGINAL) The method of claim 18, wherein said heuristic search scheme comprises choosing a number of channel taps, where the distance between a thus-chosen channel tap and a pre-selected channel tap equals to the distance between a pair of pre-selected channel taps.

22. (CANCELED)

23. (PREVIOUSLY PRESENTED) The method of claim 17, wherein recovering data in said received signal sent in said communications media is performed at 2× oversampling.

24. (CANCELED)

25. (CURRENTLY AMENDED) A method of recovering data in a received signal sent in a communications media, comprising:

    (a) estimating at least one composite channel impulse response from said received signal,

(b) estimating a set of noise covariances based on said composite channel impulse responses,

(c) assigning a set of filter-tap locations by a sequential search, with each said filter tap depending on said composite channel impulse response,

(d) computing a set of filter coefficients for said set of filter-tap locations, and

(e) filtering said received signal with said set of filter-tap locations and said set of filter coefficients.

26. (PREVIOUSLY PRESENTED) The method of claim 25, wherein recovering data in said received signal sent in said communications media is performed at a fractional oversampling rate.